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A Taxonomic Study on the Genus *Ctenosciara* (Insecta: Diptera: Sciaridae) from Japan

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Four new species of fungus gnats, *Ctenosciara japonica* sp. nov., *C. angustistylata* sp. nov., *C. meridiana* sp. nov., and *C. satoshii* sp. nov., are described and figured. *Ctenosciara hyalipennis* (Meigen, 1804) and *C. nudata* Mohrig and Kozánek in Mohrig *et al.*, 1992 are recorded for the first time from Japan. *Ctenosciara insolita* (Sasakawa, 1994) is newly recorded from Shikoku and Kyushu, Japan. Habitat preference and regional species diversity of this genus in the world are briefly discussed.

Key Words: Insecta, Diptera, Sciaridae, *Ctenosciara*, new species, new record, Japan.

Introduction

Ctenosciara Tuomikoski, 1960 is a relatively small genus of fungus gnats with only 14 known species: six from New Zealand (Mohrig and Jaschhof 1999), four from the Palaearctic region (Menzel and Mohrig 1999), two from the Neotropical region (Amorim 1992), one from Hawaii (Steffan 1973b), and one from Micronesia (Steffan 1969). So far, this genus has not been recorded from Africa, Southeast Asia, Australia, or North America.

The ecology of this genus is very poorly known. Menzel and Mohrig (1999) noted that Meigen (1804) had recorded a mass emergence of European *C. hyalipennis* (Meigen, 1804) from a flowerpot. Gerbatchevskaya (1963) recorded this species, using its synonymous name *Bradysia annulata* (Meigen, 1818), as a pest of mushrooms in the Leningrad region, while Freeman (1983) noted that larvae of this species damage greenhouse plants in Britain. Hardy (1956, 1960) and Steffan (1973a, b) reported that larvae of Hawaiian *C. hawaiiensis* (Hardy, 1956) were reared from the rotting wood of *Metrosideros*, *Freycinetia*, *Acacia koa* A. Gray, and several other plants. Menzel and Mohrig (1999) treated larval saprophagy as a synapomorphy of *Ctenosciara* and related genera. Most larvae of this genus are probably phytosaprophagous. Adults of *C. hyalipennis* and *C. nudata* Mohrig and Kozánek in Mohrig *et al.*, 1992 were collected from the inflorescence of *Arisaema nepenthoides* (Wallich) Schott in Nepal (Menzel and Martens 1995), and adults of *C. insolita* (Sasakawa, 1994) were collected from the spadices of the congeneric plant *Arisaema serratum* (Thunb.) Schott in Japan (Sasakawa 1994). Recent research indicated that *Arisaema* (Araceae) is adapted to pollination by fungus gnats (Vogel and Martens 2000).

The purpose of this study is to increase the knowledge of the diversity of the

Japanese members of the genus *Ctenosciara*. So far only one species, *C. insolita*, has been recorded from Japan (Sasakawa 1994; Menzel and Mohrig 1999), but the present paper reports on six species of *Ctenosciara* found in Japan, including four new species. We also hope that this taxonomic study may encourage ecological studies on the genus *Ctenosciara*. Comments on the habitat preference and world distribution of this genus are also offered.

Materials and Methods

All species were collected by the sweeping method in the field; *C. japonica* was also collected by emergence traps. The specimens were preserved in 70% ethanol, and most of them were mounted on glass slides in xylol-based Canada Balsam following clearing in creosote. Terminology of adult morphology follows Mohrig and Jaschhof (1999). For alphabetical symbols used in describing the wing venation, see Fig. 1E. The holotypes of *C. insolita* and *C. hawaiiensis* were examined to identify the Japanese specimens. All the type specimens prepared in the present study are deposited in the collection of the National Science Museum (Natural History), Tokyo (NSMT).

Systematics

Genus ***Ctenosciara*** Tuomikoski, 1960

Ctenosciara Tuomikoski, 1960: 110. Type species: *Sciara hyalipennis* Meigen, 1804, by original designation.

Diagnosis. Head: Eye bridge 2–4 facets wide; antenna usually bicolored, with brownish flagellomeres and yellowish scape and pedicel; 4th flagellomere about 2.5–4.0 times as long as wide; flagellar hairs dense and as long as or longer than diameters of respective segments; palpus 3-segmented, segment 1 with 1–4 setae and usually with patch of sensilla on indistinct circular area, segment 2 short, segment 3 elongate.

Thorax: Often bicolored, with dark brownish mesonotum and brownish pleura; dorsocentral and lateral bristles on mesonotum strong; posterior pronotum bare; mediotergite bare or with very fine microtrichia; scutellum usually with 4 strong bristles and several weak hairs; inner apex of fore tibia with comb-like row of bristles often subdivided into 2 parts; mid and hind tibiae each with 2 spurs of equal length, these spurs somewhat longer than width of tibial apex; hind tibia with distinct row of denticles on posterodorsal surface; tarsal claw not toothed or with very fine teeth; wing membrane without macrotrichia; wing veins R, R_1, and R_5 and branches of M and CuA with macrotrichia on dorsal side, R_5 and sometimes M and distal part of R_1 with macrotrichia on both dorsal and ventral sides; R_1 short, joining costa before level of M fork; stem of CuA shorter than x; halter with 1 or 2 rows of setae.

Abdomen: Abdominal setae well-developed; gonocoxite without intercoxal lobe or setal tuft at middle of ventroproximal part; gonostylus in most species with mutually rather similar apical tooth and subapical spines; tegmen more or less

rounded distally, almost as wide as long and well sclerotized along basal margin.

Key to the Japanese species of *Ctenosciara* (male)

1. Wing vein CuA_2 with many macrotrichia; R_5 with ventral macrotrichia along almost its whole length ..... *C. insolita*
– Wing vein CuA_2 bare or with only a few macrotrichia; R_5 with ventral macrotrichia only on distal portion 2
2. Gonostylus broad (Figs 3E, 4D) 3
– Gonostylus narrow (Figs 1D, 2D) 4
3. Anal area of wing small; CuA_2 with a few macrotrichia (Fig. 3F); apical tooth of gonostylus moderately developed ..... *C. meridiana* sp. nov.
– Anal area of wing normal; CuA_2 bare (Fig. 4E); apical tooth of gonostylus well developed ..... *C. satoshii* sp. nov.
4. Gonostylus not attenuated distally 5
– Gonostylus attenuated at apex 6
5. CuA_2 bare or with a few macrotrichia; y with macrotrichia along its whole length; length of R_1 equal to R ..... *C. hyalipennis*
– CuA_2 bare; y bare or with a few macrotrichia; R_1 about 3/4 length of R ..... *C. nudata*
6. Wing vein y bare (Fig. 1E); gonostylus as shown in Fig. 1D; tegmen rounded apically (Fig. 1D) ..... *C. japonica* sp. nov.
– Wing vein y with macrotrichia (Fig. 2E); gonostylus as shown in Fig. 2D; tegmen weakly arched at apex (Fig. 2D) ..... *C. angustistylata* sp. nov.

Ctenosciara hyalipennis (Meigen, 1804)

Sciara hyalipennis Meigen, 1804: 99. Type locality: Stolberg, Aachen, Germany.
Sciara annulata Meigen, 1818: 284.
Ctenosciara hyalipennis: Tuomikoski 1960: 110.
Bradysia annulata: Gerbatchevskaya 1963: 272–273.

Specimens examined. 5♂, 15.V.2000, Hakone town, Kanagawa Pref., 1,100 m a. s. l., leg. M. Sutou.

Remarks. This species is new to Japan. It has been recorded from many countries of Europe, the Canary Islands, Nepal, and Russia (including the Russian Far East). Menzel *et al.* (1990) once included Taiwan and New Zealand in the distribution of this species, but this was rejected in a later publication (Menzel and Martens 1995) as having been based on misidentifications. The present knowledge indicates that this species is widely distributed throughout the Palaearctic region.

Ctenosciara nudata Mohrig and Kozánek in Mohrig *et al.*, 1992

Ctenosciara nudata Mohrig and Kozánek in Mohrig *et al.*, 1992: 20. Type locality: Paekdusan Mountains, Ongsupyong, North Korea.

Specimens examined. 1♂, 5.X.1998, Ikuno town, Hyogo Pref., 340 m a. s. l., leg. M. Sutou; 2♂4♀, 29.V.2000, Hachioji city, Tokyo, 160 m a. s. l., leg. M. Sutou.

Remarks. This species is new to Japan. It has been recorded from Nepal, Rus-

sia (Primorskiy Kray), and North Korea, and is very similar to its Palaearctic congener *C. hyalipennis*. Mohrig *et al.* (1992) noted the characters that distinguish these species.

Ctenosciara insolita (Sasakawa, 1994)

Phytosciara (*Dolichosciara*) *insolita* Sasakawa, 1994: 670. Type locality: Nitchû Ruins, Tateyama town, Toyama Pref., Japan.
Ctenosciara insolita: Menzel and Mohrig 1999: 298.

Specimens examined. 1♀, 25.VIII.1998, Yamadera, Yamagata city, Yamagata Pref., 340 m a. s. l., leg. M. Sutou; 1♂, 17.III.1999, Shiroyama, Kagoshima city, Kagoshima Pref., 80 m a. s. l., leg. M. Sutou; 1♂, 20.III.1999, Jigenji, Kagoshima city, Kagoshima Pref., 60 m a. s. l., leg. M. Sutou; 1♀, 27.IX.1999, Nishitosa village, Kochi Pref., 80 m a. s. l., leg. M. Sutou; 1♂, 12.VIII.2000, Takano town, Hiroshima Pref., leg. T. Yamauchi; 1♂, 27.V.2002, Takasaki town, Miyazaki Pref., 180 m a. s. l., leg. M. Sutou; 1♂, 4.VI.2002, Hachioji city, Tokyo, 160 m a. s. l., leg. M. Sutou.

Remarks. This species is newly recorded from the above localities. It can be distinguished easily from its Japanese congeners by the presence of many macrotrichia on CuA_2 and a single row of bristles on the inner apex of the fore tibia. The new collection data presented here suggest that this species is widely distributed in Japan.

Ctenosciara japonica sp. nov.
(Fig. 1)

Description. *Male.* Head: Prefrons with several setae and clypeus with a few setae; scape and pedicel yellowish brown, rounded in shape and each with several setae; flagellomeres brown (except for yellowish brown necks); flagellar hairs almost as long as or slightly longer than diameters of respective segments; 4th flagellomere (Fig. 1A) about 3.5 times as long as wide, neck portion about 1/6 of its whole length; palpus (Fig. 1B) yellowish brown, 3-segmented with length ratio of 1:0.6:1.1, segment 1 with 2 setae and patch of sensilla on indistinct circular area, segment 2 with 6–9 setae, segment 3 with 6–8 setae.

Thorax: Color predominantly brown; lateral dark brownish bristles on mesonotum well-developed; scutellum with some strong bristles; anterior pronotum with some setae, posterior pronotum bare; legs predominantly yellowish brown, tarsus brown; fore basitarsus 1/2 length of fore tibia; inner apex of fore tibia (Fig. 1C) with comb-like row of bristles divided into 2 parts and composed of 9–11 bristles in total; fore tibial spur (Fig. 1C) 1.2–1.3 times longer than width of tibial apex; claw untoothed; wing (Fig. 1E) with brownish anterior veins and light brownish posterior veins; wing membrane almost hyaline; R, R_1, R_5, M_1, M_2, and CuA_1 with macrotrichia on dorsal side; CuA_2 bare or with a few macrotrichia on dorsal side; distal 1/4–1/3 of R_5 with macrotrichia on ventral side as well; stem of M bare or with only 1 or 2 macrotrichia; y=x, stem of CuA=2/3–3/4x, R_1=2/3R, and c=2/3–3/4w in length, respectively; R_1 ending at same level as, or slightly before, CuA_2 apex; R_5 ending slightly before level of M_2 apex; halter yellowish brown, knob with 2 rows of setae.

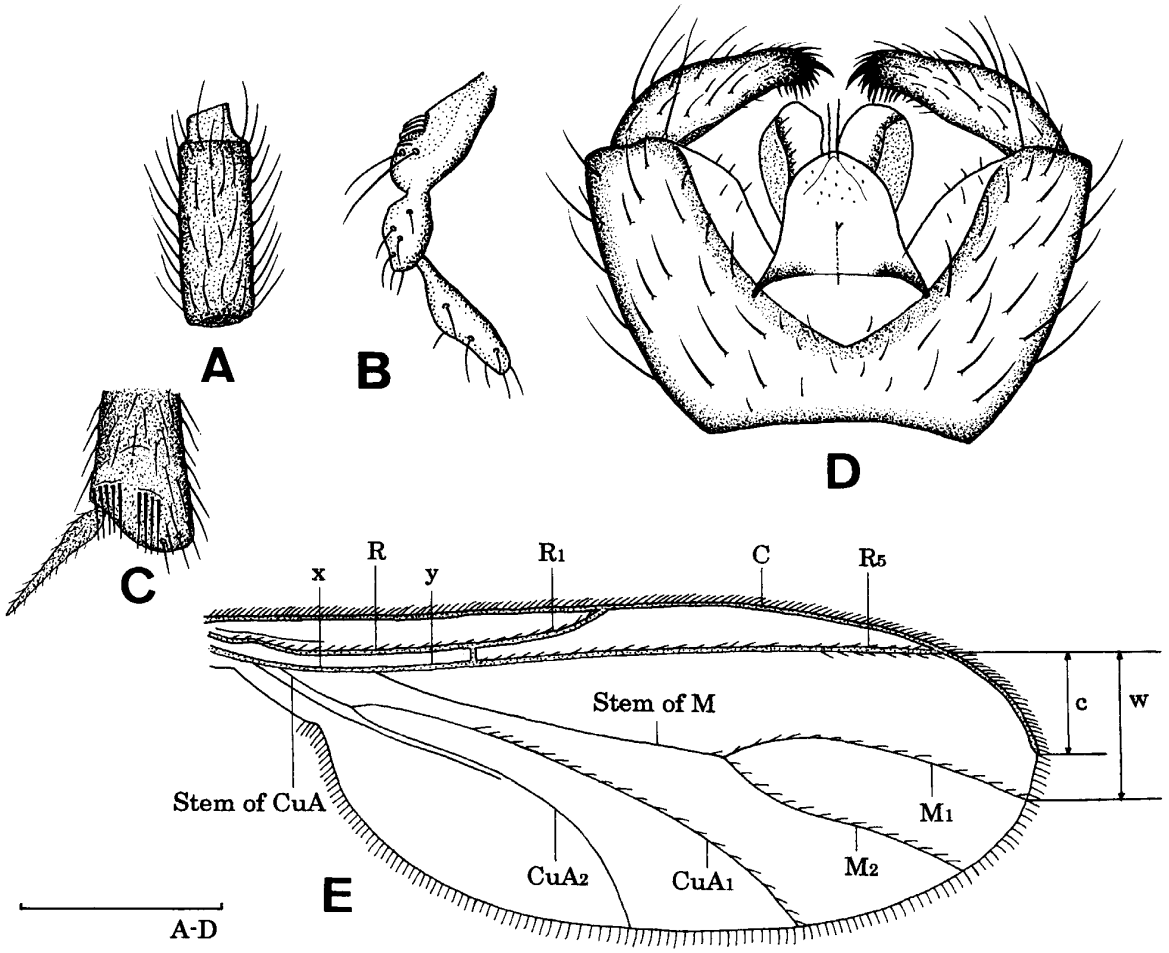

Fig. 1. *Ctenosciara japonica* sp. nov., male. A, C, D, holotype; B, paratype (NSMT-I-Dip-4263). A, 4th flagellomere; B, palpus; C, inner apex of fore tibia; D, genitalia; E, wing, generalized venation. Scale: 0.1 mm.

Abdomen: Tergum and sternum brown, pleura yellowish brown in holotype, but coloration of abdomen more or less variable; dark setae well-developed especially on tergum; gonostylus (Fig. 1D) rather slender, slightly attenuated apically, and with well-developed apical tooth and subapical spines; tegmen (Fig. 1D) rounded apically and almost as long as wide, bearing 2 apical setae and with minute denticles on upper 1/3; aedeagus moderately long and slender.

Wing length: 1.6–1.8 mm.

Female. Different from male in the following characters: scape and pedicel brown; 4th flagellomere about 3.0 times as long as wide; segment 2 of palpus with 7–12 setae, segment 3 with 7–10 setae; tibia brown; fore basitarsus 2/5 length of fore tibia; usually wing vein x slightly longer than y; stem of CuA about 1/2 of x; R_1 ending at same level as, or slightly beyond, CuA_2 apex; distal 1/3–1/2 of R_5 with macrotrichia on dorsal and ventral sides; abdominal setae on tergum brownish and less developed than those of male; wing length 1.7–2.3 mm.

Type material. Holotype: ♂ (on glass slide; NSMT-I-Dip-4262), 15.V.1999, Tokiwadai, Hodogaya-ku, Yokohama city, Kanagawa Pref., 60 m a. s. l., leg. M. Sutou.

Paratypes (all on glass slides; NSMT-I-Dip-4263–4305): 2♂3♀, 15.V.1997 and 1♂, 14.VII.2002, Izumino, Izumi-ku, Yokohama city, Kanagawa Pref., 50 m a. s. l., leg. M. Sutou; 1♂, 23–25.VIII.1998, Mukaiyama, Sendai city, Miyagi Pref., 60 m a. s. l., leg. M. Sutou; 2♂3♀, 26.VIII.1998, Kogota town, Miyagi Pref., 30 m a. s. l., leg. M. Sutou; 6♂23♀, same data as holotype; 1♂, 29.V.2000, Hachioji city, Tokyo, 160 m a. s. l., leg. M. Sutou; 1♂, 19.VIII.2001, Omosiroyama, Yamagata city, Yamagata Pref., 540 m a. s. l., leg. M. Sutou.

Distribution. Japan (Honshu).

Remarks. This species seems to be abundant in central Japan. The closest relatives of this new species may be *C. nigrostyla* Mohrig in Mohrig and Jaschhof, 1999 (q.v.) descrived from New Zealand and *C. hawaiiensis* from Hawaii (see Hardy 1956). *Ctenosciara nigrostyla* differs from *C. japonica* in having 3 setae on palpus segment 1, dorsal macrotrichia on y, and ventral macrotrichia along almost the whole length of R_5. The type specimens of *C. hawaiiensis* turned out, upon reexamination, to be different from *C. japonica* in the presence of many setae on the prefrons, 3 setae on palpus segment 1, 11–13 setae on segment 2, 9–12 setae on segment 3, a single comb-like row of bristles on the inner apex of the fore tibia, dorsal macrotrichia on y, ventral macrotrichia along almost the whole length of R_5, and a more stocky shape of the gonostylus. Determination of the female of this new species was based on the morphological characters and the collecting data.

In addition to the specimens of the type lot collected by sweeping net, we have approximately 650 alcohol specimens of this species collected by emergence traps placed on the ground in an evergreen broad-leaved forest in Yokohama city during June, 2002. This strongly suggests that the larvae of this species are phytosaprophagous, living in the soil or litter layer. In the same forest, adults were sometimes observed to rest on the surface of a dwarf bamboo *Pleioblastus chino* (Franchet and Savatier) Makino.

Ctenosciara angustistylata sp. nov.
(Fig. 2)

Description. *Male.* Head: Prefrons with several setae, clypeus bare; scape and pedicel yellowish brown, rounded in shape and each with several setae; flagellomeres brown (except for yellowish brown necks), flagellar hairs slightly longer than diameters of respective segments; 4th flagellomere (Fig. 2A) about 3.5 times as long as wide, neck portion about 1/6 of its whole length; palpus (Fig. 2B) yellowish brown, 3-segmented with length ratio of 1 : 0.7 : 1.3, segment 1 with 2 setae and fine sensilla on indistinct circular area, segments 2 and 3 each with 8 setae.

Thorax: Color predominantly light brown; lateral dark brownish bristles on mesonotum well-developed; scutellum with some strong bristles; anterior pronotum with some setae, posterior pronotum bare; legs yellowish brown to brown; fore basitarsus 1/2 length of fore tibia; inner apex of fore tibia (Fig. 2C) with comb-like row of bristles divided into 2 parts and composed of 8–9 bristles in total; fore tibial spur (Fig. 2C) not constricted proximally and about 1.3 times longer than width of tibial apex; claw untoothed; wing (Fig. 2E) with brownish anterior veins and light brownish posterior veins; wing membrane almost hyaline; R, R_1, R_5, y, M_1, M_2, and CuA_1 with macrotrichia on dorsal side; distal 1/3–2/5 of R_5 with macrotrichia on ventral side as well; stem of M bare or with only 1 macrotrichium;

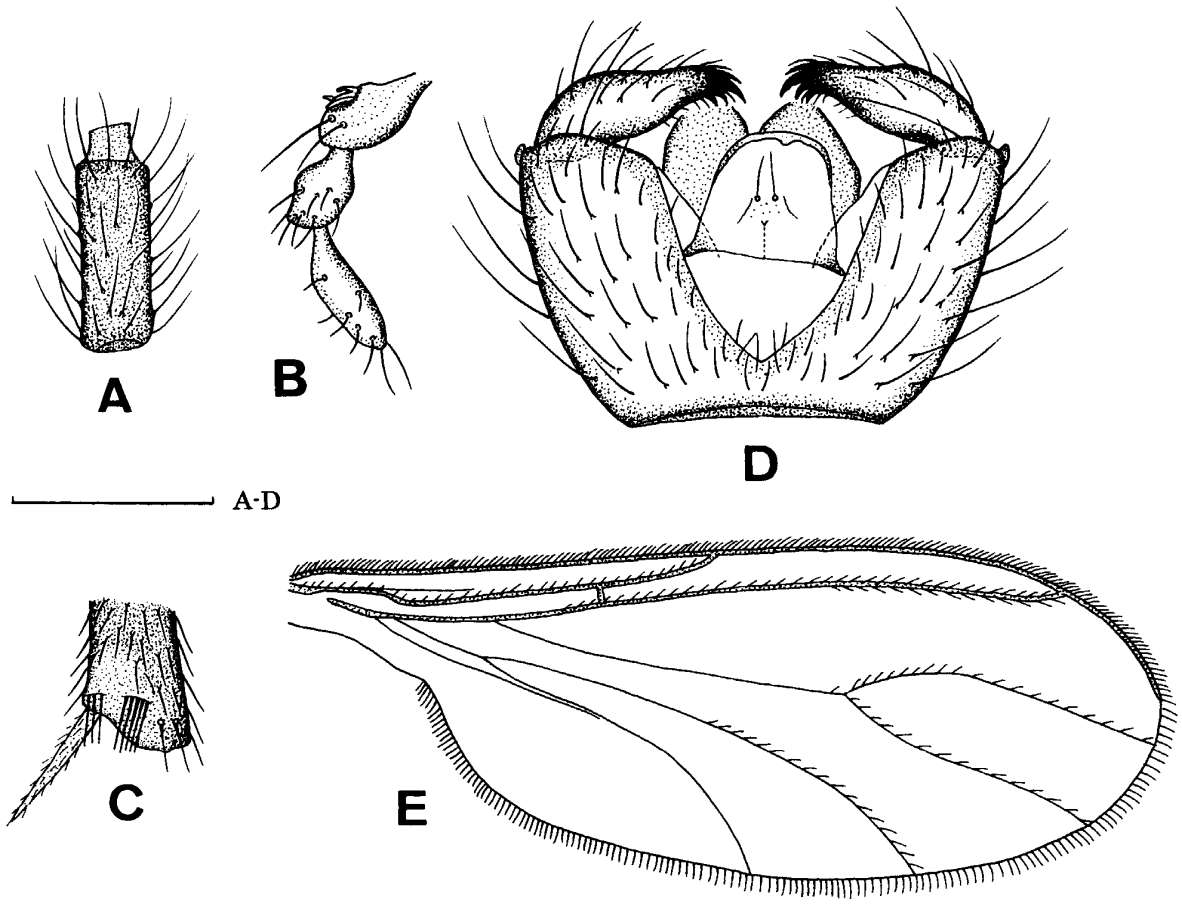

Fig. 2. *Ctenosciara angustistylata* sp. nov., male, holotype except D (paratype NSMT-I-Dip-4307). A, 4th flagellomere; B, palpus; C, inner apex of fore tibia; D, genitalia; E, wing. Scale: 0.1 mm.

y=x, stem of CuA=2/3–3/4x, R_1=1/2–3/5R, and c=2/3w in length, respectively; R_1 ending opposite apex of CuA_2; R_5 ending slightly before level of M_2 apex; halter brown, knob with several setae.

Abdomen: Predominantly brown; dark setae well-developed especially on tergum; gonostylus (Fig. 2D) somewhat reverse-clavate in shape, attenuated apically, and with well-developed apical tooth and subapical spines; tegmen (Fig. 2D) nearly trapezoidal with 2 median setae, upper 1/3 framed with brownish weak sclerotization; aedeagus slender and indistinct.

Wing length: 1.8 mm.

Female. Similar to male, but different in the following characters: 4th flagellomere about 3.0 times as long as wide; segment 3 of palpus with 9 setae; fore basitarsus 2/5 length of fore tibia; stem of CuA about 1/2 of x; R_1=2/3R in length; abdominal setae on tergum less developed than those of male; wing length 2.1 mm.

Type material. Holotype: ♂ (on glass slide; NSMT-I-Dip-4306), 19.IX.2001, Imaichi city, Tochigi Pref., 330 m a. s. l., leg. M. Sutou. Paratypes (on glass slides; NSMT-I-Dip-4307–4308): 1♂1♀, same data as holotype.

Distribution. Japan (central Honshu).

Remarks. This species is similar to *C. japonica* sp. nov., but differs from it in

the bare clypeus, the presence of macrotrichia on wing vein y, and the characteristic shapes of the gonostylus and tegmen. Determination of the female was based on the morphological characters and collecting data.

The specific name "*angustistylata*" is derived from the Latin "angustus" (narrow) and "stilus" (pen), referring to the characteristic narrow gonostylus of this species.

Ctenosciara meridiana sp. nov.
(Fig. 3)

Description. *Male.* Head: Prefrons with several setae and clypeus with a few setae; antenna largely brown, scape and necks of flagellomeres yellowish brown; scape and pedicel each almost as long as wide, with several setae; 4th flagellomere about 3.0 times as long as wide in holotype (Fig. 3A), 3.5 times in one paratype (NSMT-I-Dip-4310; Fig. 3B); flagellar hairs equal to or slightly longer than diameters of respective segments (Fig. 3A, B); palpus (Fig. 3C) yellowish brown, 3-seg-

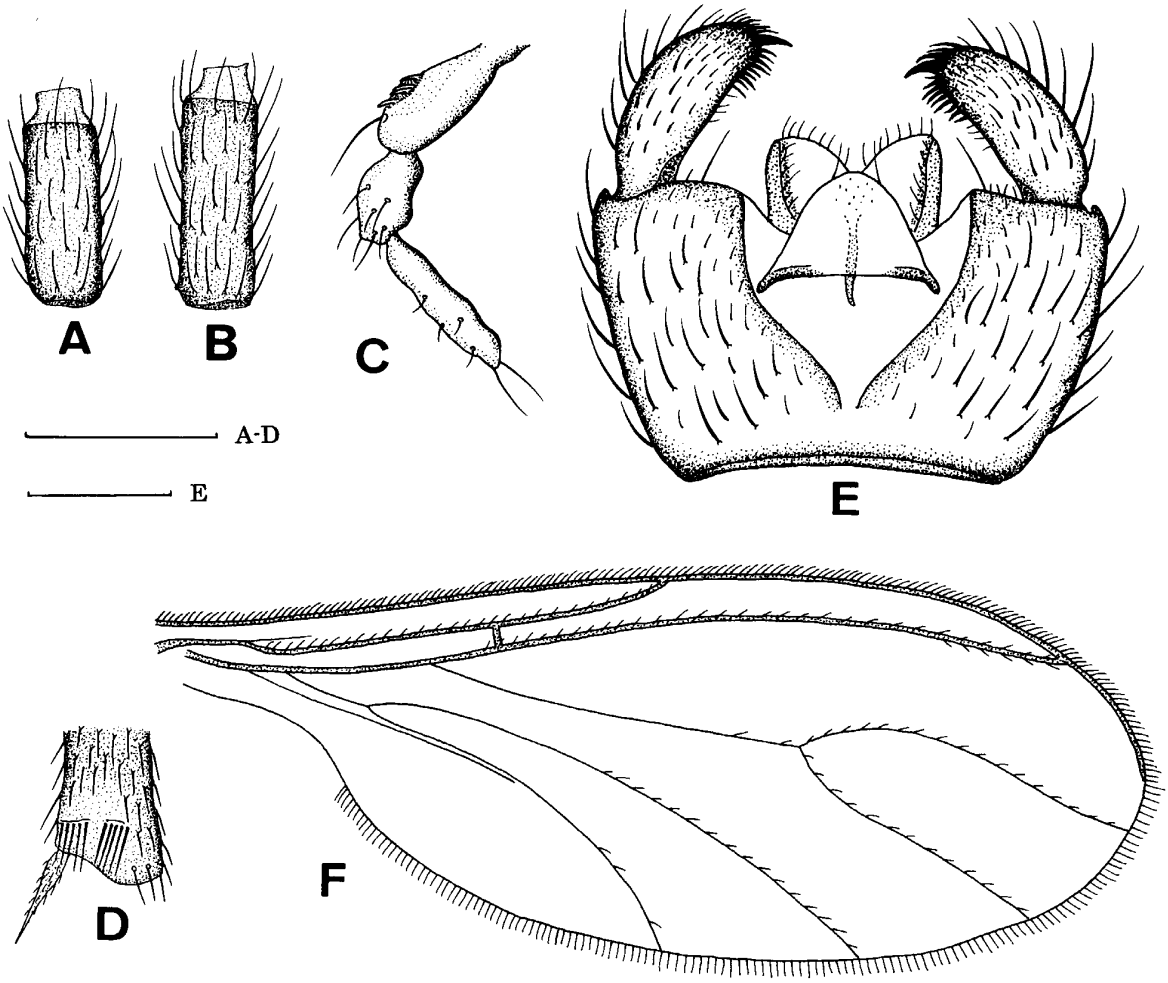

Fig. 3. *Ctenosciara meridiana* sp. nov., male, holotype except B (paratype NSMT-I-Dip-4310). A, B, 4th flagellomere; C, palpus; D, inner apex of fore tibia; E, genitalia; F, wing. Scales: 0.1 mm.

mented with length ratio of 1:0.6:1.2, segment 1 with 1–2 setae and patch of sensilla on indistinct circular area, segments 2 and 3 each with 6–7 setae.

Thorax: Mesonotum and pleura predominantly dark brown; scutellum dark brown, with strong bristles; posterior pronotum bare; legs brown; fore basitarsus 1/2 length of fore tibia; inner apex of fore tibia (Fig. 3D) with comb-like row of bristles divided into 2 parts and composed of 10–11 bristles in total; fore tibial spur (Fig. 3D) almost as long as, or slightly longer than, width of tibial apex; claw untoothed; wing (Fig. 3F) with brownish anterior veins and light brownish posterior veins; anal area of wing apparently small; wing membrane almost hyaline; R, R_1, R_5, M_1, M_2, CuA_1, and CuA_2 with macrotrichia on dorsal side, distal 1/4–1/3 of R_5 with macrotrichia on ventral side as well, y with only 1–3 macrotrichia; y=1/2–4/5x, stem of CuA=1/2–4/5x, R_1=2/3R, and c=2/3w in length, respectively; R_1 ending just opposite or slightly beyond level of CuA_2 apex; R_5 ending at same level as M_2 apex; halter brown, knob with 2 rows of setae.

Abdomen: Tergum dark brown, sternum brown, pleura and intersegmental membranes yellowish brown, dark setae well-developed especially on tergum; gonostylus (Fig. 3E) thick and bluntly curved inward, without distinct convexity or concavity, and with well-developed apical tooth and subapical spines; tegmen (Fig. 3E) rounded apically and slightly wider than long, bearing 2 apical setae and with minute denticles on upper 1/3; aedeagus distinct, with distal fork.

Wing length: 1.8–2.2 mm.

Female. Similar to male except for the following characters: clypeus bare or with minute setae; scape and pedicel dark brown; 4th flagellomere about 3.0 times as long as wide; fore basitarsus 2/5–1/2 length of fore tibia; inner apex of fore tibia with 1 or 2 comb-like rows of bristles; CuA_2 without macrotrichia; tergum and sternum of abdomen almost concolorous; wing length 2.2–2.3 mm.

Type material. Holotype: ♂ (on glass slide; NSMT-I-Dip-4309), 21.IV.2000, Sasaguri town, Fukuoka Pref., 140 m a. s. l., leg. M. Sutou. Paratypes (on glass slides; NSMT-I-Dip-4310–4313): 1♂2♀, same data as holotype; 1♂, 27.V.2002, Takasaki town, Miyazaki Pref., 180 m a. s. l., leg. M. Sutou.

Distribution. Japan (Kyushu).

Remarks. This species is well characterized by the small anal area of the wing. The length of the flagellomere seems to be more or less variable. The shape of the gonostylus of *C. constrictans* (Edwards in Tonnoir and Edwards, 1927) (q.v.), known from New Zealand, is very similar to that of the new species, but *C. constrictans* apparently differs in the constricted M fork, the long y, the presence of macrotrichia on the ventral side of the R_1 and M fork, and the normal size of the anal area of the wing (see Mohrig and Jaschhof 1999). In general features, this species rather resembles *C. griseinervis* (Edwards in Tonnoir and Edwards, 1927) (q.v.), but the shape of the gonostylus is apparently different and x is as long as y in the latter species (see Mohrig and Jaschhof 1999). The female of the new species is mainly determined by the characteristic smaller anal area of the wing and the collecting data.

The specific name "*meridiana*" is derived from the Latin term "meridies", which means "south", because the new species was collected in the southern part of Japan and the two similar species mentioned above are distributed in the southern hemisphere.

Ctenosciara satoshii sp. nov.
(Fig. 4)

Description. *Male.* Head: Prefrons with several setae and clypeus with a few setae; antenna brown, necks of flagellomeres yellowish brown; scape and pedicel rounded and each with several setae; 4th flagellomere (Fig. 4A) about 3.5 times as long as wide, neck portion about 1/5 of its whole length; flagellar hairs equal to or slightly longer than diameters of respective segments (Fig. 4A); palpus (Fig. 4B) yellowish brown, 3-segmented with length ratio of 1:0.8:1.3, segment 1 with 1 seta and patch of sensilla on indistinct circular area, segment 2 with 7–8 setae, segment 3 with 6 setae.

Thorax: Mesonotum predominantly dark brown, with yellowish dorsocentral setae and brownish lateral bristles; scutellum brownish with several bristles; posterior pronotum bare; coxae, trochanters, and femora yellowish brown, tibiae and tarsi brown; fore basitarsus 1/2 length of fore tibia; inner apex of fore tibia (Fig.

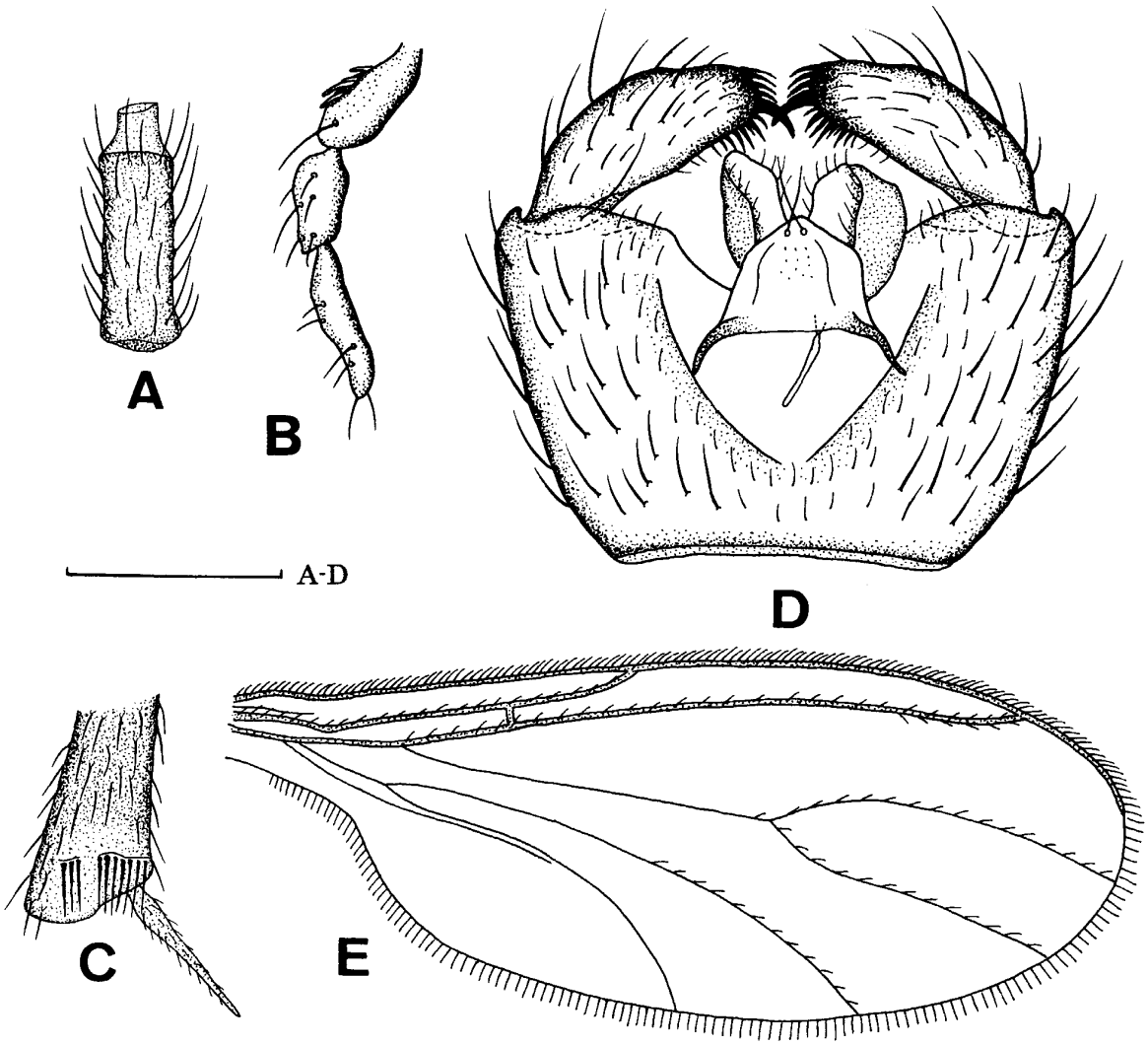

Fig. 4. *Ctenosciara satoshii* sp. nov., male, holotype. A, 4th flagellomere; B, palpus; C, inner apex of fore tibia; D, genitalia; E, wing. Scale: 0.1 mm.

4C) with comb-like row of bristles divided into 2 parts and composed of 10–11 bristles in total; fore tibial spur (Fig. 4C) about 1.3 times longer than width of tibial apex; claw untoothed; wing (Fig. 4E) with brownish anterior veins and light brownish posterior veins; wing membrane almost hyaline; R, R_1, R_5, y, M_1, M_2, and CuA_1 with macrotrichia on dorsal side; tip of R_5 bearing macrotrichia on ventral side as well; y=x in length; stem of CuA slightly shorter than x; R_1 3/5 as long as R, ending slightly before level of CuA_2 apex; R_5 ending slightly before level of M_2 apex; c=2/3w in length; halter brown, knob with row of 6–8 setae.

Abdomen: Predominantly brown, with scattered dark setae well-developed especially on tergum; gonocoxite stout, relatively large; gonostylus (Fig. 4D) thick with shallow concavity on outer surface of distal portion, and with well-developed apical tooth and subapical spines; tegmen (Fig. 4D) slightly wider than long and bluntly pointed apically, bearing 2 apical setae and with minute denticles; aedeagus moderately long, with distal fork.

Wing length: 1.6 mm.

Female. Unknown.

Type material. Holotype: ♂ (on glass slide; NSMT-I-Dip-4314), 7.VI.1998, Kirishima town, Kagoshima Pref., 320 m a. s. l., leg. M. Sutou.

Distribution. Japan (southern Kyushu).

Remarks. This species is well defined by having only 1 seta on segment 1 of the palpus, a relatively stout gonocoxite, and a thick gonostylus with well-developed apical tooth and subapical spines.

The specific name is dedicated to the author's father, Satoshi Sutou, who financially supported the author's collecting activity in Kagoshima Prefecture.

Discussion

Previous studies have suggested that many species of *Ctenosciara* are multivoltine, with adults emerging year-round except in winter. Collecting data of the present study indicate that this may be true as well for *C. insolita* and *C. japonica*.

Mohrig and Jaschhof (1999) reported that adults of *C. hyalipennis* are common in the coniferous forests of the Palaearctic region, while Menzel and Martens (1995) recorded it from a *Lithocarpus* forest in Nepal. Laurence (1992) reported high emergence abundance of this species at a reed swamp in England, however, Heller (1998, 2002) categorized it as a silvicolous species based on a survey in Schleswig-Holstein, Germany. In the course of the present study, we found it in Japanese coniferous forests. On the other hand, *C. japonica* was more common in an evergreen broad-leaved forest, where *Castanopsis cuspidata* Schottky var. *sieboldii* Nakai and *Cinnamomum camphora* Sieb. were the predominant canopy trees (Yokohama city, Kanagawa Pref.).

The present study has increased the number of known species of *Ctenosciara* to 18; of these, six are indigenous to New Zealand, five to Japan, and the rest are found scattered throughout the Palaearctic region, Pacific Islands, and South America. Each species of this genus has been recorded from a rather restricted area except for *C. hyalipennis*, which is widely distributed throughout the Palaearctic region and common in Europe. The regional diversity of this genus shows a somewhat peculiar pattern, with an abundance of species that are indige-

nous to either New Zealand or Japan. At present, *Ctenosciara* is unknown from Africa, Southeast Asia, Australia, and North America. Bechev (2000), who studied the world distribution of fungus gnat genera, noted a pattern of high faunal similarity between the Palaearctic and Nearctic regions, and considerable faunal connections between the Neotropical and Australian regions; therefore, the distribution of *Ctenosciara* will probably be shown to be subcosmopolitan as the currently undersampled regions are more thoroughly studied. This may come to suggest, in turn, that the evolutionary center of this genus lies in the Asia-Oceania region, where many indigenous species are known.

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